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Tree Planting for Idaho Farms

—Protection
—Beauty
—Value

By
VERNON F. RAVENSCROFT

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OUR COVER PICTURE shows a field of black locust seedlings on the University forest nursery. The nursery can produce 1,000,000 trees a year for Idaho windbreaks, forest products, erosion control, and other "work" uses. The nursery serves also as a valuable outdoor laboratory for the University's student-training program. In the background of the picture, the silhouette of the University's administration building rises against the western skyline.

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Tree Planting for Idaho Farms

By VERNON F. RAVENSCROFT

So you are interested in trees for farm plantings in Idaho. You and your neighbors are doing a lot of tree planting these days, and you are making good use of the trees you put to work in your woodlots, windbreaks, and other utility or conservation plantings. When you take care of these trees it is amazing how fast they develop and give you the protection or the forest product you desire.

In southern Idaho we have planted many windbreaks, particularly around farm buildings and feed yards. These plantings help to make any place more liveable. They reduce the cost of livestock feeding. It costs one-fifth less to heat a building protected by a windbreak than it does one that is in the open. When situated properly your windbreak will also control drifting snow.

In 1940, Idaho farmers were asked to place a value on their farmstead windbreaks. Their evaluations ranged from $300 to $600.

At various points in southern Idaho farmers are planting trees for field protection. Specific field records show that single-row plantings will provide enough protection to increase the crop yield as much as 2 to 6 percent over an entire 40 acres. The increase in yield is considerably more when sandy lands are protected. Field windbreaks are money makers.

Woodlots are useful and profitable on small areas unsuited to field crops. Well cared for black locust plantings at Wendell and Caldwell yielded over 3,000 posts to the acre in 10 years. At present post prices, this means a gross income of $1,000 to $1,500 for 1 acre of trees.

Many dryland wheat areas need erosion-control plantings. Soils specialists advise that land that is too steep or hilltops that have sub-soil exposed be taken out of cultivation. Woodlot or Christmas tree plantings are suitable uses for such land. Hilltop plantings hold snow away from steep but fertile slopes.

In the northern Idaho counties we need windbreaks in several communities. Some progressive farmers are planting trees back

on land which should not have been cleared from timber. In any forested community, it is wise to give careful consideration to what land to clear and what land to leave in trees. With pulp markets entering the area and with many opportunities to use or sell small timber products any forest land can yield a money crop in a few years. Some tree crops actually can be harvested within 6 years after planting.

We realize that all these fine plantings involve work. Trees need the same care you would give to a cultivated garden crop. Anything less will give only fair to poor results. Only in naturally timbered country can you place a tree in the ground and "let it grow." Even there you must limit your planting to trees suited to the area, and results are sometimes disappointing.

Tree planting for Idaho farms is a big project. There is no one set of recommendations that will fill all needs. Trees that grow at Lewiston at 700 feet elevation will not do the job in the Teton basin at an elevation of 6,300 feet. Trees that give game food and cover protection usually are not the same ones that will yield forest products. If you are to get the best trees on your farm, here is what you need to ask:

1. What type of planting do I need?
2. What trees will best do this job in my community?
3. How should I locate and space the planting?
4. Where can I get the trees?
5. How do I prepare the ground for planting?
6. How do I plant the trees?
7. What care should I give my trees after I plant them?

Types of Tree Plantings Location, Species, and Spacing Recommendations

FARMSTEAD WINDBREAKS: Farmstead windbreaks are the most popular type of tree planting in Idaho. Need for this type of planting is statewide. We have many examples of plantings that have done an exceptional job of protecting the farmstead or feed yard from damaging wind and drifting snow. Such plantings make the farm more liveable and add to the beauty and efficiency of the place. Tests made in Montana have shown that cattle fed behind a tree windbreak, during a mild winter, have gained 35 pounds per head more than those fed in the open. During a bad winter, tree-protected cattle lost 11 pounds less per head than those

fed in the open. In Nebraska, experimenters built two identical houses, one in the open, and the other behind a good tree windbreak. The protected house used 20 percent less fuel.

Location: A windbreak diverts wind in the same manner that a dam diverts water. Any combination of trees which provides dense foliage for protection both at the ground line and 40 to 50 feet up will serve as a windbreak. Location of the air dam is important.

Locate windbreaks at least 100 feet to the windward of your home. This avoids snow banks in the winter and sultry conditions in the summer. Windbreaks can be closer to outbuildings, but don't get so close that snow drifts where you least want it. Plant windbreaks as nearly as possible at a right angle to the prevailing wind. Extend them at least 50 feet beyond the area for which you want protection. Reasons for these points are:

1. You need 50 feet to stop backlash around the ends of the windbreak.
2. If a windbreak is to serve as a dam for air, it must be crosswise to the current.
3. You need 100 feet to get beyond the dead air space which occurs immediately behind any good windbreak. This dead air space collects snow in winter. It is sultry in summer.

In most Idaho communities the wind blows from the west or southwest. If this is the prevailing wind at your place, you will need an L-shaped planting to the south and to the west. Where storms are changeable, we sometimes make U-shaped plantings on three sides of the farm buildings.

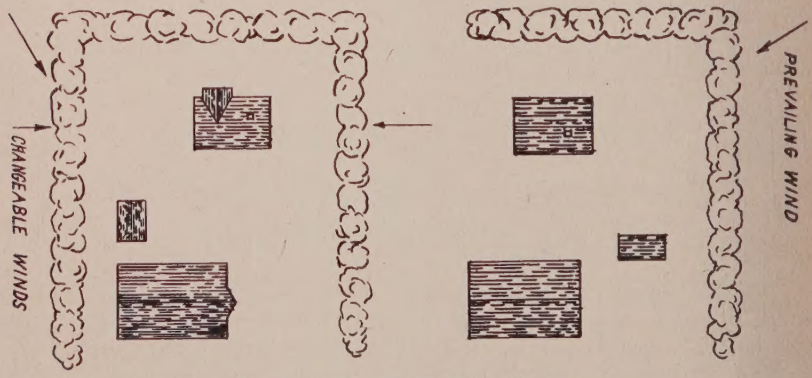


Figure 1.—Locating Windbreaks

Any good windbreak will give excellent protection over an area 8 to 10 times as wide as the height of the trees. It will give some protection to an area 20 times its height.

Arrangement and Space: In Idaho we usually need a combination

of at least three types of trees in separate rows to give quick, satisfactory protection. These three types should include a bushy broadleaf tree on the windward side, a tall tree in the middle, and a bushy evergreen on the inside.

One row of each type can be considered a minimum windbreak. Additional rows can be added when needed. On irrigated farms, windbreaks are often made into combination windbreaks and woodlots by adding several rows of tall trees. Because of the wide spacing necessary in dryland plantings, from four up to seven rows are used. These would include one or two bushy rows, two rows or more of tall trees and one or more rows of evergreens.

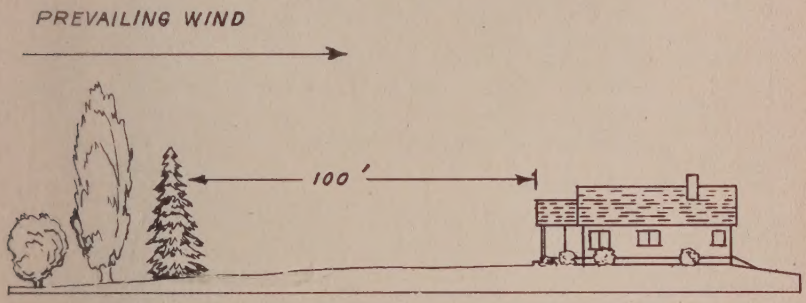


Figure 2.—Windbreak Diagram

Irrigated Spacing			*Dryland Spacing*		
	Between Trees	Between Rows		Between Trees	Between Rows
Bushy	3′	9′	Tall	12′	12′
Tall	9′	9′	Bushy	6′	12′
Evergreen	9′	9′	Evergreen	12′	12′

In irrigated plantings add 3′ to 5′ between rows when locust or willow are used next to spruce, pine or fir.

ALLOW MORE SPACE BETWEEN ROWS IF NEEDED TO ACCOMMODATE YOUR TRACTOR AND CULTIVATOR.

The space recommendations in this diagram suggest 9 feet between the rows for irrigated and 12 feet between the rows for dryland planting. In both cases adjust this row spacing to fit your cultivation equipment. Do not come under the 9- and 12-foot spacing. Allow more if you need it. Hand cultivation is seldom finished.

Any windbreak spacing is a compromise between the trees' needs at maturity and how soon you desire protection. Close spacing will give quick protection but eventually will produce a tall, crowded tree which gives little protection. Wide spaced plantings are slow to develop protection, but they will have a longer useful life.

When a heavily limbed, broadleaf tree such as black locust or golden willow grows next to a stiff evergreen like spruce, Douglas fir, or pine, leave at least 12 feet between the broadleaf tree and the evergreen. Unless you give this extra space, the limbs of the broadleaf will reach out far enough to rub off the top of the evergreen. Pruning can help avoid this damage.

Stand: The space between trees is important; gaps give no protection. When using the between-tree space mentioned in the diagram, you will need nearly a 100 percent stand on any small shrubs such as Siberian pea. Occasional losses of Russian olive or mulberry are not serious when the trees are planted 3 feet apart. Two dead trees in a row may leave a gap. On the tall trees, one loss now and then isn't serious, but when two or more die next to each other, they must be replaced. The same is true on bushy evergreens, particularly juniper. Spruce, on the other hand, becomes extremely large. Actually, one mature spruce every 18 feet is sufficient to form an excellent windbreak.

Species

EXPLANATION. This map lists in a general way the main tree planting areas of Idaho. The number of the area where the trees are generally suited is listed after each tree in the summary which follows.

Because this map is generalized, there are a few exceptions we must note. In Area 1, plant locust only at the lower elevations such as sites around Moscow and Coeur d'Alene. In Area 3 black locust will do all right on selected planting sites around

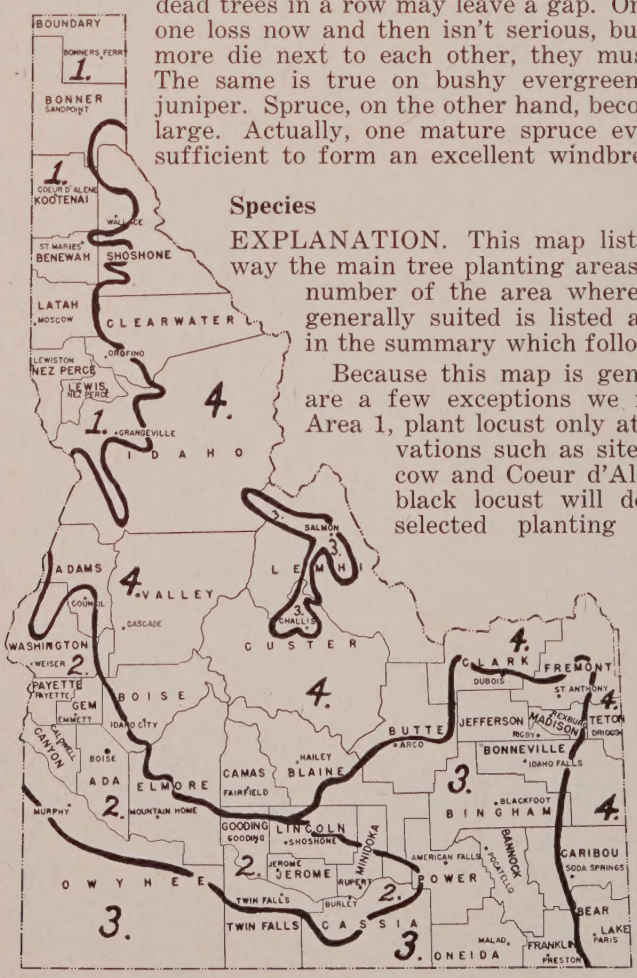


Figure 3.—Tree Planting Areas of Idaho

American Falls, Blackfoot, Preston and Malad.

At the other extreme, on the upper elevations in Area 3, honey locust is likely to freeze back if planted at Grace, Rexburg, Dubois, Arco, or Challis. Additional exceptions are ponderosa pine and Douglas fir which can be grown in Areas 2 and 3 if soils are low in lime or alkali.

Table 1.—Suitability of Various Trees For Use in Idaho Planting Areas.

Trees	Area of The State Where Suited
Bushy Hardwoods	
Russian Olive	2, 3
Siberian Pea	1, 2, 3, 4
Russian Mulberry	1, 2, 3
Multiflora Rose	Most of 1, 2. Others unknown
Southernwood	1, 2, 3, 4
Tall Hardwoods	
Black Locust	Warmer parts of 1, all of 2 Special sites in 3
Green Ash	1, 2, 3
Honey Locust	1, 2, 3
Siberian Elm	1, 2, 3
Golden Willow	1, 2, 3, 4
Tall Evergreens	
Ponderosa Pine	1, 4
Lodgepole Pine	1, 4
Scotch Pine	1, 2, 3, 4
Dense Evergreens	
Norway Spruce	1, 2, 3
Blue Spruce	1, 2, 3, 4
Juniper	1, 2, 3, 4
Douglas Fir	1, 4

Table 2.—Recommended Windbreak Combinations

Area of State	Bushy Trees in order of preference	Tall Trees in order of preference	Dense Evergreens in order of preference
(1) Northern Counties	Russian Mulberry	Black Locust (where suited)	Norway Spruce
	Siberian Pea	Siberian Elm	Juniper
	Multiflora Rose	Green Ash	Douglas Fir
		Ponderosa Pine	Blue Spruce
(2) Lower Snake River Valley, Irrigated	Russian Olive	Black Locust	Juniper
	Russian Mulberry	Green Ash	Norway Spruce
	Siberian Pea	Scotch Pine	Blue Spruce
(3) Upper Snake River Valley, Irrigated	Russian Olive	Green Ash	Juniper
	Siberian Pea	Scotch Pine	Norway Spruce
		Honey Locust	Blue Spruce
Dryland	Russian Olive	Siberian Elm	Juniper
	Siberian Pea	Green Ash	
	Southernwood	Ponderosa Pine	
(4) Mountain Areas	Siberian Pea	Golden Willow	Juniper
	Lilac	Lodgepole Pine	Blue Spruce
	Southernwood	Ponderosa Pine	

FIELD WINDBREAKS: In the Snake river valley we have some soils that will "blow". This "blow soil" is hard to farm and much of its fertility is lost to the repeated wind erosion. Tests show that *19* times as much phosphate and *10* times as much humus are in the material that blows from a field as compared to the heavier particles which stay on the field. Wind frequently damages crops at planting time and blows some crops off the ground at harvest.

Field windbreaks are one way to control this wind damage, and we know that these field windbreaks will increase the crop yield. The following table shows the effect of field windbreaks on various crops in Twin Falls county.

Table 3.—Crop Increases From Field Windbreaks

Crop	No. of Fields	Yield Increase
Beans	4	1.3% to 7.4%
Beets	1	1.2%
Wheat	2	2.1% to 6.4%
Clover	1	5.2%

We got these figures by comparing yields in the same field part of which had protection and part of which had no protection. These records were taken on heavy soils. The increased yields would be even greater on "blow type" soil.

Field windbreaks may have either one or two rows. In a two-row planting, use a combination of either a bushy tree and a tall tree or a tall tree and an evergreen. Use the tall-tree evergreen combination where winter or early spring winds give the most trouble. Planting the larger bushy trees such as Russian olive and tall trees like black locust in the same row will give an excellent one-row field windbreak. Use a 6-foot spacing and alternate the bushy and tall trees.

Figure 4.—One-row field windbreaks

Do not mix evergreens in the same row with broadleaf trees. Small bushy trees like Siberian pea will not hold their own in a mixed planting, either. If you use the two-row combination, follow the windbreak species-and-spacing recommendations on pages 7 to 9.

Locate field windbreaks at right angles to the eroding winds. Repeat the plantings about every ¼ mile. Quick protection over an entire area can be had by planting a single row of a fast growing bush every 200 to 300 feet across a "blow" field. Space the shrubs 3 feet apart in the row. Southernwood is very good for this type of planting. Siberian pea will give better protection but is much slower to develop. Both are grazed heavily by livestock. Some people have planted these small shrub windbreaks along their flood dikes. This way they take no crop ground for the planting. Neither pea nor southernwood competes with field crops. Other farmers have planted shrub "breaks" as temporary protection while their regular field windbreaks along the "forty" lines are becoming established. When the main windbreak is large enough to give protection, they plow out the temporary shrub wind "catchers".

You may be concerned about root competition between field crops and windbreaks. This problem is not serious if you plant the right kind of trees. For instance, black locust and Siberian pea are legumes and do not seriously compete with crops. If you have a porous soil, deep rooted trees such as the green ash will give you no field competition. Do not use shallow rooted trees such as poplar or willow. In all cases where you plant trees next to a field, place a deep dead-furrow between the trees and the field. Keep it about 8 feet from the trees and keep it free of trash. It will be best to keep this furrow dry, then irrigate the trees by use of a small corrugation up near the tree trunks. Using a dry dead-furrow will eliminate field competition from any field windbreak.

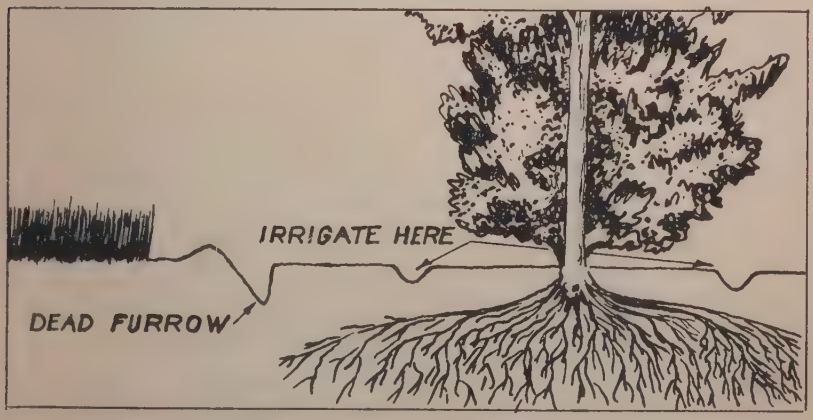


Figure 5.—Use a Dead-Furrow to Eliminate Field Competition

NATIVE WINDBREAKS: Natural trees growing on your land are often too tall and free of limbs for good windbreak use. They are good for the tall trees in a windbreak. If you are clearing land, leave a band of trees about 30 feet wide where you want your windbreak. Plant a row of bushy trees to the windward to strengthen it.

WOODLOTS AND OTHER FOREST PRODUCTS: Many Idaho farms contain fields that for some reason such as shape, slope, shallow soil, frost, or erosion are not suited to cultivation.

Tree crops grow in a relatively short time and can be money makers on land of this kind. Locust fence-post plantings have yielded 3,000 posts per acre in 10 years. Christmas trees take 7 to 14 years for growth. Small logs are available from locust in 15 to 25 years. Posts can be grown from pine trees suited to the locality in 15 to 20 years and small logs in 30 to 40 years.

Hardwood Woodlots. SPACING: Irrigated 6′ x 6′, Dryland 12′ x 12′

Table 4.—Woodlot Trees for Idaho

Irrigated Below 4,000′ So. Counties	Dryland So. Counties	Irrigated 4,000′ to 5,500′ So. Counties	Mountain Valleys	Northern Counties
Black Locust	Siberian Elm	Honey Locust Green Ash Siberian Elm	None	Black Locust (Only on warmer sites.) Green Ash

Black walnut and chestnut are being tested and may prove suited to portions of our state. Walnut is known to do well on irrigated plantings in the Snake river valley from Weiser to Blackfoot.

Evergreen Woodlots. SPACING: Irrigated, 6′ x 6′, Dryland, 9′ x 9′. For certain post and pole uses, a straight evergreen tree is superior to hardwood trees. And the evergreen can sometimes be used for Christmas trees and will in time produce a log crop. Here are some planting recommendations. SOUTHERN IDAHO: Scotch pine is generally suited if given proper care. Do not plant pine on alkali soils. MOUNTAIN VALLEYS: ponderosa pine or lodgepole pine. Limit the ponderosa pine to sites that have both soil and air drainage. Use lodgepole on swampy or frosty lands. NORTHERN COUNTIES: ponderosa pine, Scotch pine, white pine, Norway spruce, Douglas fir, and western red cedar can all be considered. The tree to plant varies with the site on which you wish to place it. In general, ponderosa pine is best suited to most farm land. Cedar is suited to wet areas.

Christmas Tree Plantations. SPACING: recommendation 4′ x 4′ or 6′ x 6′, depending on degree of management given. Growing Christmas trees is new in Idaho. A few farmers have started plantations and others are improving stands of native trees for Christmas tree production. Present Idaho markets are such that a farmer who can assure himself of a reliable retail or a better-than-average wholesale market can get a fair income from Christmas trees. Douglas fir is our most popular Christmas tree. It is well suited throughout the northern counties and will grow on selected sites in our southern counties.

One of the outstanding Christmas trees is concolor fir. It is a tree that commands a premium price for special uses such as office buildings and lodge functions. This tree is native to the southern Rocky Mountain area. It develops slower than the Douglas fir but, as a premium tree, may return a greater income to the Christmas tree farmer. It does exceptionally well in northern Idaho. It will also grow on selected planting areas in our southern counties.

In the eastern states, Scotch pine is becoming a popular Christmas tree. It is sold under the name of "Golden Christmas Tree" and brings a premium price. Scotch pine will develop faster than either Douglas fir or concolor fir. It is suited to a wider variety of soils and climatic conditions. On many of our areas, this tree will grow too fast for Christmas tree production. It is suited to all areas of Idaho, but may be damaged by snow when planted in mountain valleys.

The 6′ x 6′ spacing will use 1,210 trees per acre of land. This spacing is recommended where the main sales demand is for 6 to 7 foot trees. When a Christmas tree grower has a market for small 2 foot to 4 foot trees, this space can be reduced to 4′ x 4′. You will then plant 2,723 trees per acre. When the trees reach the apartment size, 2′ to 4′, one-half of them should be harvested, cut so as to leave the remaining trees in a diamond-shaped pattern.

Original Spacing 4′ x 4′

After thinning, "c" means trees cut, remaining trees are in an 8′ x 8′ diamond

Figure 6.—Thinning Pattern for Christmas Trees

This 4′ x 4′ spacing is used only when you can harvest small trees. When such a planting is not thinned, the trees will grow too tall and spindly by the time they reach the "front room" 6′ to 7′ floor size.

Anyone planning to farm Christmas trees should obtain specific information on (a) suitability of their soil; (b) protection and

care of evergreen trees; (c) markets. County agents can obtain information on these items for you.

EROSION-CONTROL PLANTINGS: Trees and woody shrubs are frequently used in erosion-control work.

Land Retirement: Steep land, hilltops, and other eroded areas are often retired to a tree crop. These areas aren't worth farming and they may be harming the tillable land next to them. Trees are one of the "crops" which will hold such land in place. Woodlots and Christmas tree plantings are the most practical tree plantings for land retirement use.

Check the recommendations given on page 12 before you make up your mind as to what you want to plant for woodlot or Christmas tree production. If your site is *very* poor, then increase the space both between the trees and between the rows by ⅓ to ½. For example, irrigated woodlot plantings on very poor land would be increased from 6′ x 6′ to 9′ x 9′.

Gully and Stream Bank Control: At various places in Idaho, we have gullies and streams with banks that are eroding. Plants like rose and snowberry are best for gully control. Under severe conditions, matrimony vine can be used. Golden willow is best suited for stream bank control. Plant it well up on the side of the bank and use a 6-foot spacing. Be careful to plant the willow so that an open channel is left for the stream. If trees are planted so that their stems or low-hanging limbs get down into the water they often collect enough trash to form a dam and then force the water out into a new channel. This will cause a new erosion problem instead of controlling the old one.

When planting for gully control, use a 3′ x 3′ spacing and plant the area solid. In communities where it is suited, multiflora rose is preferred to other roses for it will not spread by underground runners. See page 17 for recommendations on this shrub. In large gullies where much of the sub-soil has been exposed, plant matrimony vine on the poorer soils and the rose on the better soils. In most gullies, this means that the matrimony vine will be planted in the bottom of the gully with the rose on the side and up on top. Where you have wet growing conditions, substitute snowberry for matrimony vine. When these plants become established, they will also provide a valuable home for wildlife.

Snow Trap Planting: In rolling wheat country snow banks cause serious soil loss. These snow banks form at the top of steep slopes and cause both gullies and slippage when they melt in the spring. This problem can be solved, and the crop yields increased, by the use of snow trap plantings which hold the snow back on the gentle slope. Such plantings reduce erosion and give additional moisture to the drier gentle slope. Snow trap plantings also have been made to protect driveways.

For snow trap plantings, one or two rows of a dense, bushy shrub such as southernwood, Siberian pea or multiflora rose are

sufficient. Use a 3-foot spacing between trees and make the planting perpendicular to the drifting wind. Place the planting at least 50 feet back on the gentle slope from the crest of a hill or 50 feet to the windward side of a driveway. Plantings made on the crest of a hill will make the drift problem worse instead of correcting it.

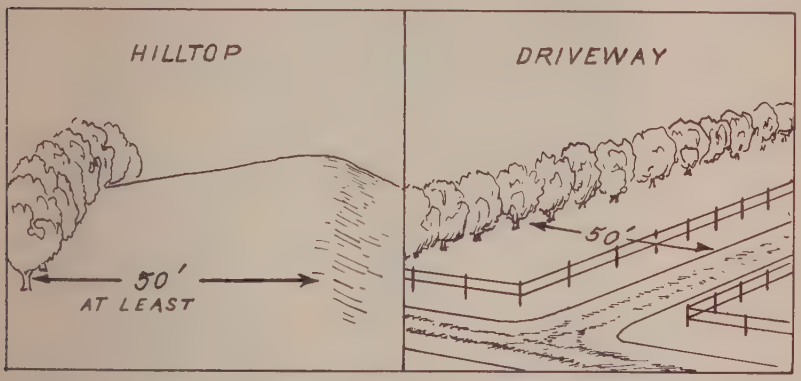


Figure 7.—Where to Place a Snow Trap Planting

Sand Dune Plantings: Few people can afford to lose their farms to a moving sand dune. There are a few places in Idaho where this is happening. Both grass and tree plantings have been made on dunes to control their movement. This involves technical problems and anyone desiring to make such a planting should have personal advice from a qualified technician before going ahead with his planting.

Many of our Idaho dunes are so situated that standard windbreaks can be established on the normal land to the windward side of the dune. Where this is the case, plant the recommended farmstead windbreak that is best suited for your community. Place it just to the windward of the dune. Give it the same cultivation and irrigation needed for a farmstead planting. As the windbreak develops, it holds the wind up off the dune and gives nature an opportunity to grow plants on the sand. For this type of dune control, use at least a three-row planting and favor fast growing trees and those that grow the tallest.

GAME FOOD AND COVER: Many farmers and sportsmen are now asking, "What can we do to bring back more game birds?" The shortage of pheasants and quail on land where the birds were formerly numerous is attributed largely to cleaner farming practices and widespread removal of stubble and brushy cover. Food is less important than cover. A winter cover that will stand up against snow, provide shelter from the wind, and hamper the movements of predators is what the birds need most on our modern "clean" agricultural land. Enough waste grain and weed seed are usually

available, but the birds must have good escape cover. Plantings of special food and cover plants will go a long way toward making up the game lost through the use of new agricultural practices.

Figure 8.—Game Birds Need Dense Bushy Cover

A wildlife planting should include shrubs of the hedge or low windbreak type and some type of low ground ground cover that will stand up under the crushing effects of heavy snow. This will permit the birds to move around underneath. Food-producing shrubs are most valuable if their fruits stay on the twigs until February when the birds need them most. Plant a minimum of 250 to 500 plants in a wildlife planting.

For ease of cultivation during the first year or two, plant the shrubs in rows. A good wildlife planting will have more than one variety of food or cover plants. This gives balance in the habitat.

Many farmers will be interested in including plants which have game food and cover value as part of their other tree plantings. For instance, in planting a windbreak, use Russian olive or multiflora rose as the bushy tree and you produce both food and cover. Rose fences would be of considerable help to game on your farm. Erosion-control plantings can use plants that are good for game, and even woodlot plantings can be bordered with bushy trees or shrubs that give food and protection. Plantings of this type can have the desired effect in increasing the supply of birds and at the same time serve other work purposes on the farm. Enthusiasts may desire to make special plantings just to help the game. Any "out-of-the-way" waste area on the farm is a good place to make such a planting.

The plants which are of the most value for game food and protection are listed in the table on page 17.

The officials of the Idaho Fish and Game department are eager to help farmers establish food and cover on their farms and are helping to establish demonstrations that show the value of these plantings. In addition, they have arranged to pay part of the bill for the purchase of stock which farmers want to plant for game use. In return for this help, they ask only your invitation to work

with them in game habitat improvement work. Your county agent has the special price list for this program in which the Game Department helps to pay the cost of the planting stock. Plants obtained under this special arrangement are not limited to game plantings but can also be used for erosion plantings, windbreaks, fences and other "work" purposes around the farm.

Table 5.—Trees and Shrubs for Game Food and Cover

Species	PROVIDES		
	Winter Food	Weather Protection	Predator Protection
Bushy Shrubs and Vines			
Southernwood		x	
Multiflora rose	x	x	x
Wild grape	x	x	x
Matrimony vine		x	x
Larger Bushy Trees			
Russian olive	x	x	x
Russian mulberry		x	x
Hawthorn	x	x	x
Western Hackberry	x	x	
Upright Trees			
Crab apple	x		
Mountain ash	x		
Black locust	x		
Any dense evergreen		x	x

NATURAL FENCES: There is considerable interest in the use of multiflora rose as a natural fence. It will grow a livestock-proof fence which during the growing season is attractive. Test plantings have been made. So far, we have found the plant unsuited to swampy conditions. It may do poorly on alkali soils. Frost damage has been experienced on the more severe planting sites. It will not provide good fence protection when planted on shaded ground.

Figure 9.—A Multiflora Fence

Photo Courtesy S.C.S.

There are several limitations to consider before using multiflora rose for fencing purposes. At maturity it will have approximately a 12-foot spread across the base of the row. The plants will not spread by underground suckers, but they will spread by tipping. Rose canes which come in contact with moist ground will take root and put up new shoots. Rose used as a fence should be limited to the following places:

1. Where it is desired because of its beauty.
2. Where the spread by tipping can be controlled by use of a mower or by grazing livestock.
3. Where space is not important.

At present we recommend multiflora for plantings below 4,000 feet in southern Idaho and in the warmer communities of northern Idaho. Preliminary tests indicate that it may be suited to an even wider range.

Spacing should be 3 feet between plants. At this spacing the rose should provide fence protection in 3 to 4 years. Make replacements so as to maintain a solid 3-foot spacing. Where dead plants cause a 6-foot gap, a weak spot may show up in your fence.

Testing work is not yet complete on multiflora rose. Check with your county agent as to the most up-to-date information concerning its use in your community.

Where to Get Your Trees

PRIVATE NURSERIES: Local, private nurseries are stocking some trees that are suitable for windbreaks and other "work" type plantings.

SCHOOL OF FORESTRY, UNIVERSITY OF IDAHO: The nursery at the University of Idaho School of Forestry grows trees for "work" type plantings. Such plantings include windbreaks,

Figure 10. — A Bundle of Trees Ready for Shipment to an Idaho Farm

growing forest products, and all the other plantings described in this bulletin. The nursery puts out small 1- to 4-year old seedlings. These small trees, when given good care, will give much better survival and will grow faster than trees transplanted at a larger size. The school does not produce trees for ornamental plantings.

In addition to supplying "work" trees for planting in Idaho, the forestry nursery also serves as an outdoor laboratory for training students. Through the Clarke-McNary Forestry Act, some help is given by the U. S. Department of Agriculture, and the State of Idaho gives some assistance. Because of this help, the School sells its trees at about one-half the cost of production. Anyone is eligible to buy these trees provided they are used only for "work type" planting. The buyer is asked to agree that the trees will *not* be used in ornamental plantings and that they will not be resold with roots attached. The season for ordering trees from the School of Forestry is November 1 of one year to March 1 of the following year. These dates are mailing deadlines. Price lists can be obtained at your county agent's office or by writing to the University of Idaho School of Forestry nursery, Moscow, Idaho. Unless special arrangements are made, all deliveries will be made to your county agent's office and will reach you in the spring at the best planting time for your area.

LOCAL SEEDLINGS: In some cases you can get local transplants from trees that have started in a garden, field border, or along a stream bank. This is the best way to get windbreak plants such as lilac or any trees which are not generally available from a nursery. If you are moving wild trees, be careful to move them properly and be certain of the kind of tree you are getting. Many undesirable trees such as elm, poplar, and box elder are growing wild and might be planted by mistake.

Moving wild stock takes enough time that it may be more expensive than buying trees from a nursery. Most wild trees have a spreading root system. In moving them you must either move small trees or else take a large amount of the root. This is hard work, particularly so when you are moving evergreens where a ball of dirt is necessary to protect the roots.

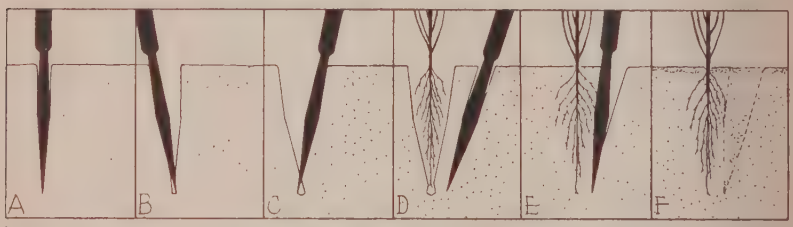
Preparing the Ground

Prepare the site well in advance of planting time. The one exception to this rule is for plantings made on "blow" sand. Disturb such land as little as possible. Summer fallow for dryland plantings. Fall plowing is desired for irrigated plantings. Leave the ground rough over winter and work it down firm as soon as possible in the spring. Trees need a firm seed bed.

When you plant on land you cannot plow, "scalp" a space about two feet wide so as to remove the competition of grass and weeds. Carefully select your planting site. If possible, plant the trees

where they will have shade and protection. In making plantings on unplowed land, it is much more important to place the trees on a desirable spot than to maintain a definite spacing.

Figure 11.—Planting a Tree by the Dibble Method



A—Use a spade, shovel, or dibble to make a vertical slit as deep as the tree roots are long. **B** and **C**—Press the dibble forward and backward to enlarge the "slit". **D**—Place the roots of the tree into the slit and spread them making sure they are not crowded or massed at the bottom. Place the tree slightly deeper than it was previously, as shown. Also insert the dibble on an incline about 4 inches back of the slit. **E**—Press the dibble forward and wedge the soil tightly against the roots and remove the dibble. **F**—Fill the last slit with damp soil firm by tramping about the tree and the closure slit. Then mulch the surface inch of soil.

When and How to Plant

WHEN: You can plant trees at any time they are dormant, from early fall to mid-spring. In many parts of Idaho, however, frost damage is common. This is particularly true on heavy soils where "heaving" takes place. Because of this, we recommend that trees be planted in the spring. Try to plant 1 to 3 weeks before the trees growing on your farm usually leaf out.

There is one exception to this rule. On coarse, sandy land, frost heaving is no problem, but spring drought many times causes serious loss. On sandy lands, fall plantings may be best.

CARE OF STOCK AFTER ARRIVAL: If your trees can be planted soon after arrival, they may be kept in the bundles. The bundles should be loosened, watered, and stored in a shaded, cool, well ventilated place.

If planting is not possible for 3 or 4 days, "heel-in" the trees. Heeling-in is storing stock in a V-shaped trench placed on a cool spot of ground. Cut apart the bunches of trees and place them along the side of the trench. Leave about ½ inch space between each two trees. Cover the roots with moist soil and pack the trees down tightly. Heeled-in trees may keep for long periods of time if the temperature is cool enough to keep the stock from growing.

HOW: When you are ready to plant, place the trees in a bucket of muddy water or in a knapsack where the roots can be covered by wet moss or leaves. Cover trees left in the bundle to protect them from the wind and sun. The roots of any tree, particularly the

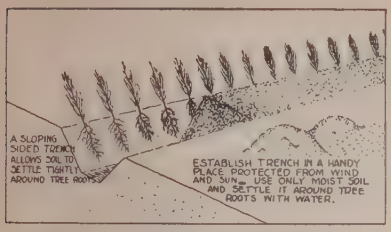

A SLOPING SIDED TRENCH ALLOWS SOIL TO SETTLE TIGHTLY AROUND TREE ROOTS
ESTABLISH TRENCH IN A HANDY PLACE PROTECTED FROM WIND AND SUN. USE ONLY MOIST SOIL AND SETTLE IT AROUND TREE ROOTS WITH WATER.

Figure 12.—Heeling in Trees

evergreen, must be protected at all times. They are killed by just a few seconds exposure to wind or sun. Don't kill your trees before you plant them. Once they are dried out no amount of care will bring them back.

Hand Planting: For lots of 200 trees or less, hand planting is practical. The small trees used for "work" plantings can be planted in a small slit; you need not dig a hole for them. Make this slit with a spade or a bar-type planting tool called a "dibble". Place the tree well down in the slit and then lift it back to the ground level. This will straighten out the roots. Plant the tree about one-half inch deeper than it normally grew. Close the slit with the planting tool and tamp the dirt firmly around the tree. Kick loose dirt around the base of the tree to serve as a mulch.

Figure 13.—Care While Planting: Have a Good Firm Weed Free Seed Bed. 2. Carry the Trees in a Pail of Muddy Water. 3. Do Not Expose Roots. 4. Plant Firmly.

Plow Planting: For lots of more than 200 trees, most farmers like to use a plow to speed up the planting. Use a standard moldboard plow and make a furrow that is deep enough to allow the roots to spread without bending. Carry the trees as instructed above. Place them against the sharp side of the furrow and kick enough dirt around the roots to prevent drying and to hold the tree upright. When you have placed the entire row, turn the tractor and plow back so as to fill in the furrow around the trees. Turn a second time and run the large wheel of the tractor as near to the trees as

possible. This is done to pack them firmly into the ground. After this, the only thing left to do will be to straighten and tramp to pack the ground around any that are loose. Trees should be as firm after planting as if they had grown on the spot.

Experienced hand planters will plant about a tree a minute, or 500 a day. By use of a tractor and plow, a two- or three-man crew can plant several thousand trees per day. If you have a large tree planting in mind, tree-planting machines are available. They will plant 1,000 or more trees in an hour. Such equipment as celery planting machines can also be made over for tree planting.

Care of Trees

DRYLAND PLANTINGS: Clean cultivation is the key to success in establishing trees on dry farms. They do well if they get the available moisture. They fail if they have to compete with grass and weeds. Where the rainfall is around 15 inches or more, this cultivation can be stopped in 3 to 5 years. In extreme dry areas where the rainfall is only 8 to 10 inches, tree plantings should be given clean cultivation throughout their lives. In all cases, arrange the spacing of the trees so as to cultivate them with your regular cultivator.

Figure 14.—A Well Cultivated Dry Land Planting

IRRIGATED PLANTINGS: For the first year, irrigated plantings should be given cultivation and water in the same manner as you would handle row crops in your community. In the case of evergreens, they may need this special care for 2 to 3 years. Irrigated plantings can be helped by growing a few rows of corn between the tree rows. The type of shade given by the corn is a help. Plant the corn rather thin; too much corn can choke out trees.

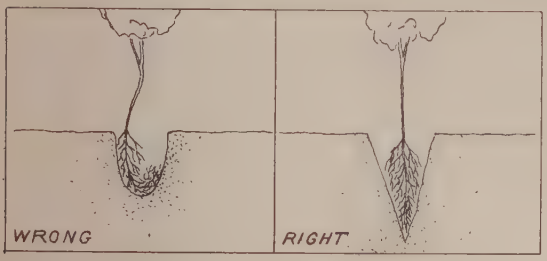


Figure 15. — Roots should be spread out and point downard.

ESTABLISHING EVERGREENS: Evergreen trees are harder to start than most broadleaf trees. They are native to mountain climates where the weather is cool and the soils neutral or acid. Our desert and prairie climates are not natural for evergreens and most desert soils contain lime or alkali which makes it even harder to establish successful evergreen plantings. In northern Idaho the soils and climate are generally suited to evergreens. Given average care and cultivation, they can be established in these counties.

In southern Idaho where evergreens are hard to establish, they need special care. Care for them, just as you care for plants in your garden. Shading is desirable during the first 2 years.

The corn cover-crop suggested for any irrigated planting will be especially helpful to evergreens. And shades made of shingles or burlap will help. Locate shades to the south and west of the trees. Do not put a close "stove-pipe" shade entirely around any tree. This is harmful to the tree. Some farmers have found it advisable to purchase a few more trees than they need. They plant these in a garden row 18″ apart to be used later for replacement purposes.

Some people who understand moving larger trees like to plant all of their evergreens in the garden and give them special care until they are about knee high. Then in the early spring they dig them with a ball of unbroken dirt around the roots of each tree and move them to the windbreak planting. Commercial nurseries often plant their evergreens in gallon sized tin cans with holes in the bottom for drainage. They keep these cans in a garden row until the trees are about 18 inches high, then plant them, can and all, directly to their permanent location. This makes the care harder, but the transplanting is much easier.

There is great variation in the ability of various evergreens to stand the climate and soils of our southern communities. The best trees in order to suitability are juniper, Scotch pine, Norway spruce, blue spruce.

GRAZING: Protect young trees from all livestock including poultry. Chickens many times pick the buds off young trees. Do not graze a windbreak planting. Woodlots can be grazed lightly after the trees are 20 or more feet tall. For best results, turn the animals in for only a few days. Allow them to eat down the weeds and grass then remove them. This avoids trampling and rubbing damage. After a few weeks turn the animals in for another short period. It is dangerous to overgraze black locust. The foliage and pods of this tree are slightly poisonous and have been known to kill sheep.

Locust woodlots can be lightly grazed without harm to the animals.

RODENTS: Rabbits, mice, and other small rodents frequently cause damage to tree plantings. If you have a rodent problem, check with your county agent. From him you can get repellents and baits that will work well in controlling these pests. Mice often do their damage under the snow. It is best to kill off the mice before the first snowfall. Removing weeds and underbrush by cultivation is in itself a good form of mouse control. Mice seldom cause damage where there is no trash.

INSECTS AND DISEASES: The trees we recommend for various types of plantings are those we know to be least susceptible to serious diseases or insect attacks. However, there are some insects and diseases which do damage our "work" trees, and new diseases or damaging insects are always possible. Your county agent will know the control measure for the insects and diseases that are already present in your community. If your trees do not look thrifty, contact the county agent or send a descriptive sample of the damaged portion of the tree to the Extension Forester, University of Idaho.

Tree Descriptions

When the proper tree is used in the right place and given adequate care, it is surprising how fast a tree planting such as a windbreak or woodlot will develop. The following specific information about the various trees mentioned in this bulletin will help you decide what tree to use for any planting on your place.

BUSHY BROADLEAF TREES

Russian Olive *(Eleagnus angustifolia)* is a small tree with a dense bushy growth habit. It bears a heavy crop of gray-green leaves and is an ideal tree for quick windbreak protection.

Average height, 1 yr.—2′; 5 yrs.—15′; maturity—40′. *Sprouting*—negligible.

Uses—Use Russian olive for the outside windbreak row and for single-row field windbreaks. It provides winter food and protection for birds. Russian olive is suited for plantings on well-drained soil in the Snake River valley up to 5,500 feet elevation.

Cautions—Many trees die out of plantings where the soil remains wet during most of the growing season. Do not plant Russian olive north of the Salmon river or in any of our mountain valley communities. It freezes in the mountain areas and is subject to disease attack in our northern counties.

Siberian Pea *(Caragana arborescens).* This shrub or small tree is a legume with the appearance of a shrub form of alfalfa. It is one of our most cold- and drought-resistant plants. Yellow blossoms appear in late May or early June.

Av. height, 1 yr. — 2′; 5 yr.—10′; maturity — 15′. *Sprouting* — crown only.

Uses—Siberian pea is a standby for use in the bushy windward row of a windbreak. It is good for snowtrap plantings.

Cautions—None. It can be used over all Idaho.

Russian Mulberry *(Morus alba var. tatarica)* is a small tree with a dense growth habit. It flowers in early spring and has edible berries from June to August.

Av. height, 1 yr.—1′; 5 yrs. — 8′ ; maturity — 40′. *Sprouting*—not serious.

Uses—Russian mulberry is recommended as the substitute for Russian olive north of the Salmon river. It is useful for the bushy row in windbreaks and for game food and cover plantations in all parts of Idaho except our mountain valleys.

Cautions—It is not so frost hardy as the olive. It is often injured in areas where early frosts are common.

Southernwood *(Artemisa abrotanum)* is a dense, bushy shrub of the sagebrush family. It has a rapid growth.

Av. height, 1 yr. — 4′; 2 yrs. — 6′; maturity — 7′. *Sprouting*—crown only.

Uses—Southernwood is useful for snow trap plantings and for game cover and erosion control. It is sometimes used as a temporary bushy row in windbreaks. It is extremely hardy and does well in mountain basin plantings. Southernwood will freeze back to the snow line during the winter but will resume growth in the spring and attains normal height within a few weeks.

Cautions—Southernwood can be used state-wide. Don't place it where a larger shrub or tree is needed.

Multiflora Rose *(Rosa multiflora japonica)* is a dense, fast growing shrub described in detail on page 17.

Av. height, 1 yr. — 1′ to 2′; maturity 8′ high, 12′ wide. *Sprouting* — no root sprouts, some from tipping.

Uses—Windbreaks, natural fences, erosion control, outstanding for bird food, cover and protection.

Cautions—Can you grow tea roses in your garden without any special care or protection? If so you can probably grow multiflora.

Lilac *(Syringa spp.)* is one of our hardiest shrubs and is common in all farming areas of Idaho.

Av. height, 1 yr. — 2′; 5 yrs. — 8′; maturity — 12′. *Sprouting*— heavy but mainly at the crown.

Uses—Lilac makes an excellent bushy tree for windbreaks in mountain valley communities. Sprouts from local bushes are entirely satisfactory for plantings of this type.

Cautions—None. Lilac can be used state-wide. It is tolerant of both frost and mild alkali.

TALL BROADLEAF TREES

Black Locust *(Robinia pseudoacacia)*. A fast growing tree.

Average height, 1 yr. — 4′; 5 yrs. — 25′; maturity — 60′. *Sprouting* — heavy from injured roots, otherwise not serious.

Uses—This is an ideal tree for irrigated woodlots up to 4,000 feet elevation. Also does well on the warmer dryland sites in northern Idaho. It will produce fence posts in 7 to 14 years. Is used as the tall tree in windbreaks, and is ideal for field windbreaks as it does not compete with most crops. The strong, durable wood is used for fence posts and for agricultural implements such as Pitman rods, handles, and canvas slats. Black locust makes high quality fuel. One cord has a heat value of one ton of anthracite coal.

Cautions—Do not plant black locust on ditch banks or along fence rows. Injured roots will sprout, resulting in a thicket of locust trees. The area for planting black locust is limited.

Honey Locust *(Gleditsia triacanthos)* is a close relative of black locust, but has a slower growth rate. Flowers appear in May and June. Large seed pods appear later. Its range is much wider than black locust. Honey locust will grow at elevations up to 4,750 feet in southern Idaho.

Av. height, 1 yr. — 3′; 5 yrs. — 15′; maturity — 70′. *Sprouting* — not serious.

Uses—Honey locust has a desirable wood but is not so durable or strong as black locust. Its main use is for woodlot plantings. Honey locust produces heavy crops of nutritious seed pods that have livestock food value. This tree is being promoted in the east as a pasture shade tree.

Cautions—Don't plant honey locust in mountain areas. Its growth is slow in our northern counties.

Green Ash *(Fraxinus pennsylvanica var. lanceolata)* forms a large, dense, stately tree. It is deep rooted and has a long life. It is slower in growth than the other hardwoods recommended for Idaho plantings.

Av. height, 1 yr. — 2′; 5 yrs. — 15′; maturity — 75′. *Sprouting* — not serious.

Uses—Green ash is ideal for ditch-bank and fence-row plantings. Where black locust is not suited, green ash is used as the tall tree in windbreaks.

Cautions—This tree grows well in all of Idaho except the mountain valleys.

Siberian Elm *(Ulmus pumila)* is a tall, dense, fast growing tree.

Av. height, 1 yr. — 3′; 5 yrs. — 20′; maturity — 60′. *Sprouting* —not serious.

Uses—Siberian elm has the ability to make rapid growth under dry conditions and is particularly well-suited for windbreak or woodlot plantings on the drylands of southeastern Idaho.

Cautions—We do not recommend Siberian elm for irrigated areas as its fast growth produces a brittle wood. From Twin Falls down river and in the Moscow-Lewiston area several insects seriously attack this tree.

Golden Willow *(Salix alba var. vitellina)* is a "tree-form" willow that does not sucker or spread from runners. It is a fast growing tree and gets its name from its orange colored bark.

Av. heght, 1 yr. — 3′; 5 yrs. — 25′; maturity — 40′. *Sprouting* —crown only.

Uses—Golden willow is quite hardy and is used as the tall tree in mountain valley windbreak plantings. It also finds state-wide use for stream bank control and other erosion work. It is sometimes planted for livestock shade.

Cautions—None. It can be used state-wide.

TALL EVERGREENS

Scotch Pine *(Pinus sylvestris)* is a fast growing evergreen; its needles are in groups of two. The tree has a rich orange colored bark.

Av. height, 1 yr. — 1′; 5 yrs. — 6′; maturity — 70′.

Uses—This tree is suited to a wide variety of climatic and soil conditions. It grows fast enough for use as a woodlot tree or as a tall tree in windbreak plantings. Growers sell it to eastern markets as a Christmas tree.

Cautions—It can be grown state-wide, but may be damaged by snow in mountain valley areas.

Ponderosa Pine *(Pinus ponderosa)* is our most important timber-producing pine. It is fast growing and attains a great height. The needles are usually in groups of three and are 5 to 11 inches long.

Av. height, 1 yr. — 10 inches; 5 yrs. — 4′; maturity — 160′.

Uses—Ponderosa pine is used for pole and pulp production and as a tall tree in dryland and mountain windbreaks. It does exceptionally well on hot, dry sites.

Cautions—Do not plant on wet or frosty bottomlands. It will not grow on alkali or high lime soils.

Lodgepole Pine*(Pinus contorta)* is a medium-sized tree with a long slender main stem. Needles are in groups of two and are 1 to 3 inches long.

Av. height, 1 yr. — 8″; 5 yrs. — 3′; maturity — 70′.

Uses—Lodgepole pine is a valuable post, pole, and pulp producer. It is frost hardy and is used as a tall tree in mountain valley windbreak plantings.

Cautions—Sun scald is serious on this tree when it is planted on hot, dry sites.

White Pine *(Pinus monticola)*, the Idaho state tree, is our fastest growing native pine. The needles are in groups of five and are 2 to 5 inches long.

Av. height, 1 yr. — 8″; 5 yrs. 5′; maturity — 175′.

Uses—White pine will produce post or pulp-size timber in 15 to 25 years.

Cautions—It is generally suited only to northern Idaho counties. White pine is susceptible to blister rust.

BUSHY, DENSE EVERGREENS

Rocky Mountain Juniper *(Juniperus scopulorum)* is a dense, bushy tree that will grow under all climatic and soils conditions found in Idaho. The leaves are held flat to the stem like scales on a fish.

Av. height, 1 yr. — 8″; 5 yrs. — 6′; maturity — 40′.

Uses—Under cultivation Rocky Mountain Juniper grows rapidly and is an excellent evergreen for windbreaks. It has game food and cover value. It will eventually produce posts and also "fancy-wood" products.

Cautions—None. Rocky Mountain juniper can be planted state-wide.

Virginia Juniper *(Juniperus virginiana)* is similar to Rocky Mountain juniper but it has a more dense, lacy foliage.

Av. height, 1 yr. — 8″; 5 yrs. — 6′; maturity — 40′.

USES—This tree can be used for the same purposes as Rocky

Mountain juniper. Plant it on the better sites, for it will not stand as much sun, drought, or frost as will the Rocky Mountain type.

Cautions—Virginia juniper is not suited for mountain valley plantings. It should not be planted in commercial apple producing areas for it will carry apple rust disease.

Norway Spruce *(Picea abies)* is a fast growing spruce. It develops dense foliage that is dark blue-green.

Av. height, 1 yr. — 8″; 5 yrs. — 4′; maturity — 100′.

Uses—Norway Spruce ranks next to juniper and Scotch pine in tolerance for southern Idaho lime soil. Norway spruce makes a good inside row for windbreak plantings.

Cautions—Do not plant Norway Spruce at elevations of more than 5,500 feet.

Blue Spruce *(Picea pungens)* is a slower growing tree than the Norway spruce but develops a very thick, dense foliage. Leaves are light blue-green in color.

Av. height, 1 yr. — 8″; 5 yrs. — 2′; maturity — 80′.

Uses—Blue spruce is the most colorful and efficient of the evergreens used in Idaho windbreak plantings. Its use is encouraged for mountain valleys where the extreme hardiness of this tree makes it highly desirable.

Cautions—Slow growth during the first few years is its only drawback.

Douglas Fir *(Pseudotsuga taxifolia)* is a large, dense-foliaged tree. Color is a very bright green or sometimes a blue-green.

Av. height, 1 yr. — 9″; 5 yrs. — 2′ to 3′ depending on site; maturity — 100′.

Uses—Douglas fir is the most popular Christmas tree grown in Idaho. Its fragrance, balance, and bright green color make it extra well suited for this use. It is satisfactory for use in the inside row of windbreaks in our northern counties.

Cautions—Douglas fir is hard to get started under the climatic and soil conditions found on southern Idaho irrigated lands.

General Caution on all Evergreens: Evergreens are hard to start under hot, dry conditions. Lime type soils are not natural for any but the junipers. Read the special section on "Establishing Evergreens," page 22.

Any evergreen may be attacked by such insects as red spider, or scale. Usually these pests cause the tree to look shabby but they seldom kill the tree. Control measures are well known but application may be difficult on large trees. Evergreens can be seriously damaged by winter burning caused when wind or sun drys out the needles during a period when the roots and stem of the tree are frozen and cannot replace the lost moisture. A mulch of plain straw and irrigation after the trees are dormant will help protect against this burning.

SUMMARY

I. PLAN

Get the right tree and the right type of planting for your needs. Type of tree, location of planting, and spacing are important.

II. PLANTING

A. PREPARE THE GROUND BEFORE PLANTING
Trees are easier to plant and will grow faster on well-prepared ground and you will have fewer weeds to cultivate from the planting after the trees are growing.

B. TAKE CARE OF THE TREES IMMEDIATELY
Unpack your trees from the bundle and moisten the roots as soon as possible. Unless you can plant them right away, "heel-in" the trees in a cool, shady place.

C. PLANT PROPERLY
As you plant, carry the trees in a pail of muddy water. The roots will dry out and die if exposed to sun and wind. Be sure all of the tree's roots, plus about ½ inch of the trunk, are planted firmly in the ground.
A tractor and a plow make tree planting easier.

D. CARE FOR THE TREES AFTER PLANTING
Fence out livestock.
Cultivate to keep weeds out.
Replace trees that die during the first few years.

For local information, ask your county extension agent or write to:

EXTENSION FORESTER
College of Agriculture
Moscow, Idaho

RECOMMENDATIONS

Windbreaks—

Outside—Bushy	**Center—Tall**	**Inside—Evergreen**
No. of rows.....	No. of rows.....	No. of rows.....
Species	Species	Species .....
and/or	and/or	and/or .....
Spacings:	Spacings:	Spacings:
Between trees	Between trees	Between trees .....
Between rows	Between rows	Between rows .....

Other Plantings—

Species	No. of rows	Spacings:
.....		Between trees .....
.....		Between rows .....